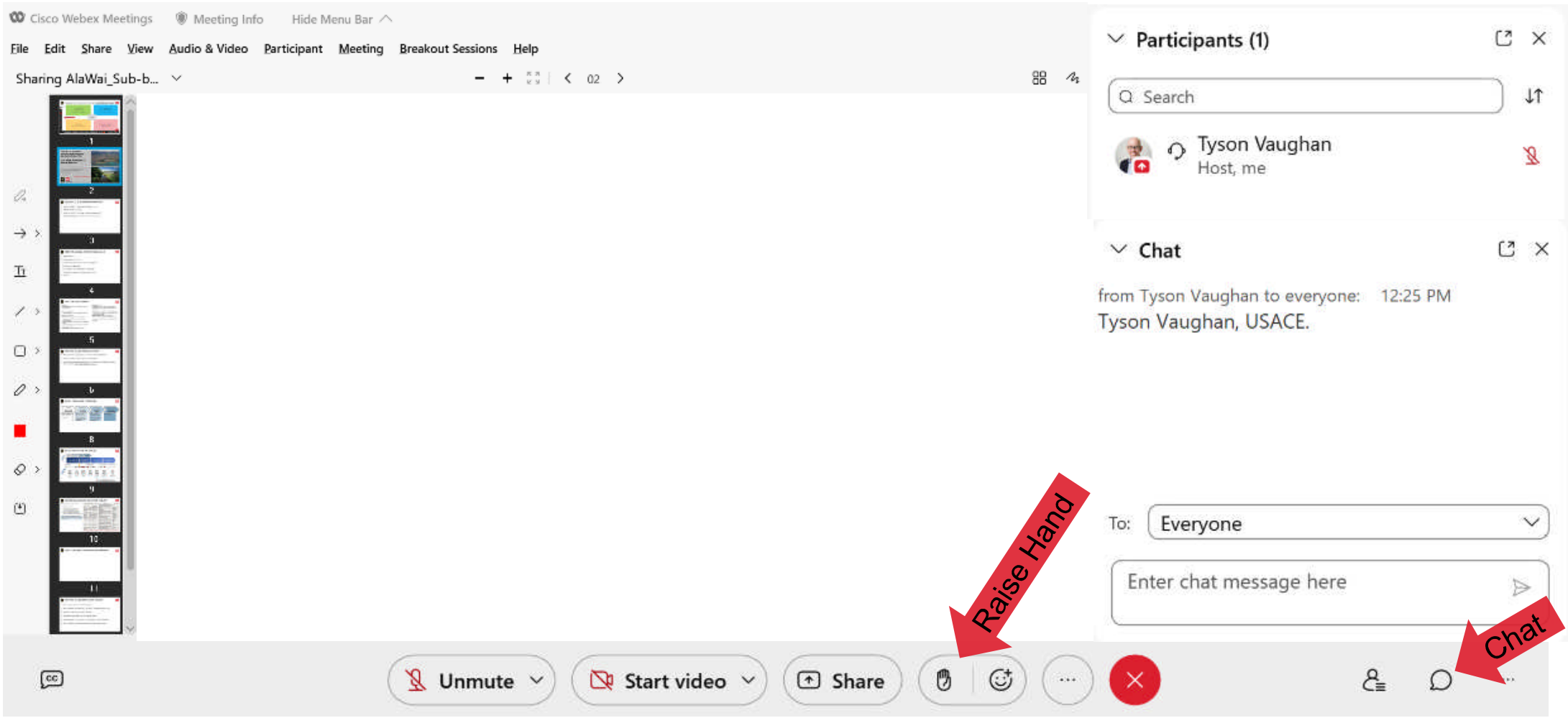
WELCOME!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Participants (1)
Search
Tyson Vaughan
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Chat
from Tyson Vaughan to everyone: 12:25 PM
Tyson Vaughan, USACE.
To: Everyone
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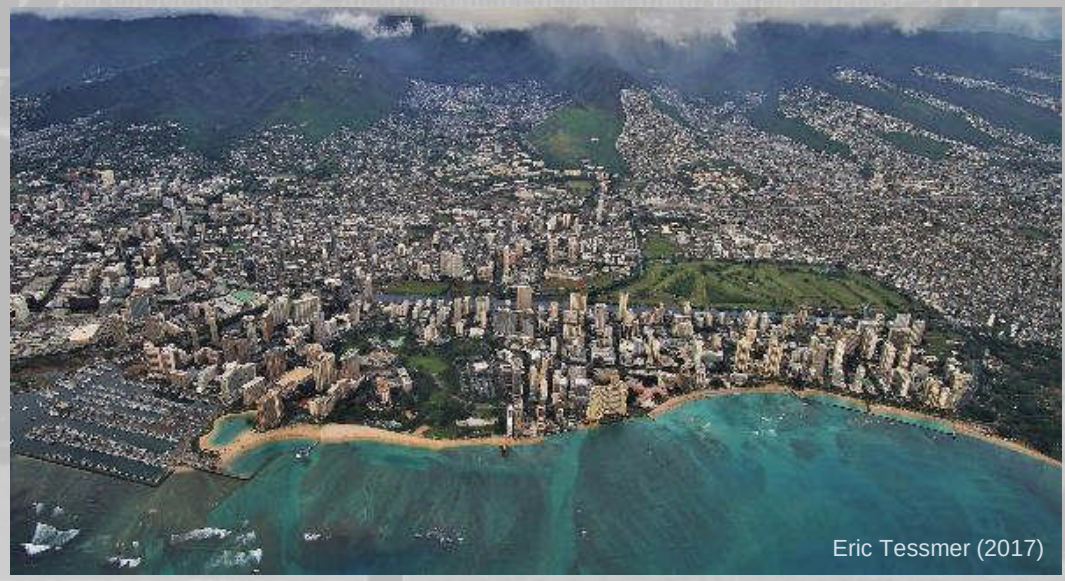
ALA WAI FLOOD RISK MANAGEMENT GENERAL RE-EVALUATION STUDY

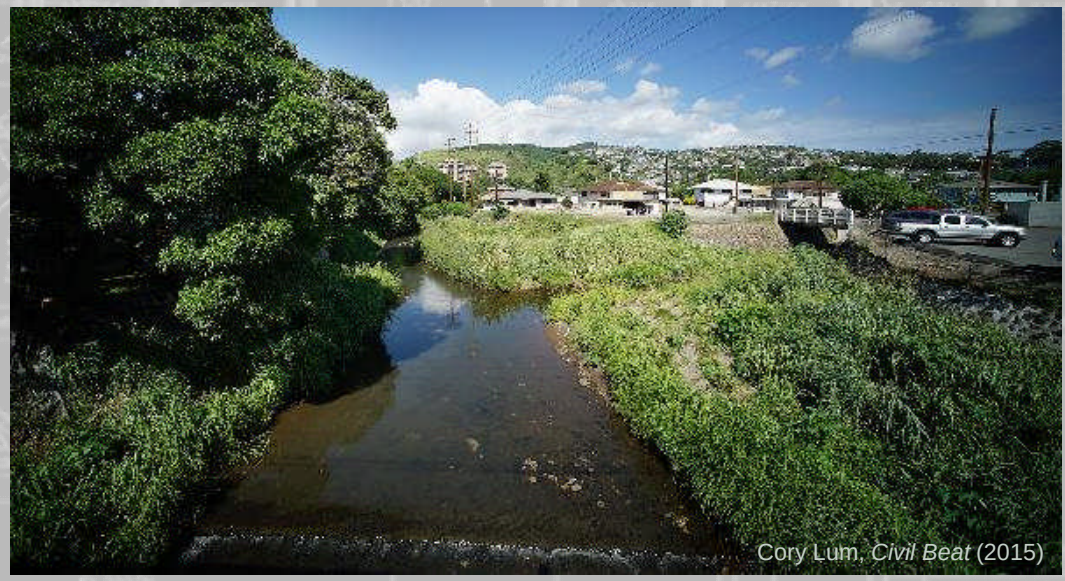
WORKSHOP: ALTERNATIVES

US Army Corps of Engineers (USACE)
City and County of Honolulu (CCH)

26 July 2022
*This session is being recorded.

US Army Corps of Engineers®


Eric Tessmer (2017)


Cory Lum, *Civil Beat* (2015)

OBJECTIVES

1. Rank and provide feedback on initial alternatives.
2. Generate additional, community-preferred alternatives.
3. Explain plan formulation process.
4. Provide up-to-minute update on technical analysis.
5. Preview future opportunities for additional input.

TODAY'S AGENDA

1. Introduction (10 min) ← You are here!
2. Opening Remarks (10 min)
3. Presentation: study update and plan formulation (30 min)
4. Workgroups: rank proposed alternative plans (45 min)
5. Report-outs to large group (15 min)
6. Workgroups: generate your preferred alternative (45 min)
7. Report-outs to large group (15 min)
8. Wrap-up (10 min)

(3 hours total)

REVIEW: COMMUNITY INPUT

1. Nov 2021: Scoping Workshops (x 2)
2. Jan 2022: Information Forum
3. April 2022: Sub-basin Workshops (x 4)
4. **July 26, 28, 2022 (T, Th): Alternatives Workshops**

- 12.5 hours of public meetings thus far
- Over 270 participants in first seven public meetings
- 223 total management measures (~200 suggested by public)
- 168 Crowdsource Reporter comments
- Dozens of emails to AlaWai@honolulu.gov

- More opportunities to come

HOSTS & DISCUSSANTS

Presenters (USACE):

- **Cindy Acpal**, Project Manager
- **Eric Merriam**, PhD, PMP; Planner; *Study Lead*
- **Kelley Philbin**, PE; Engineer; *Technical Lead*

MC / Lead Facilitator (USACE):

- **Tyson Vaughan**, PhD; Sociologist

Additional Facilitators (USACE):

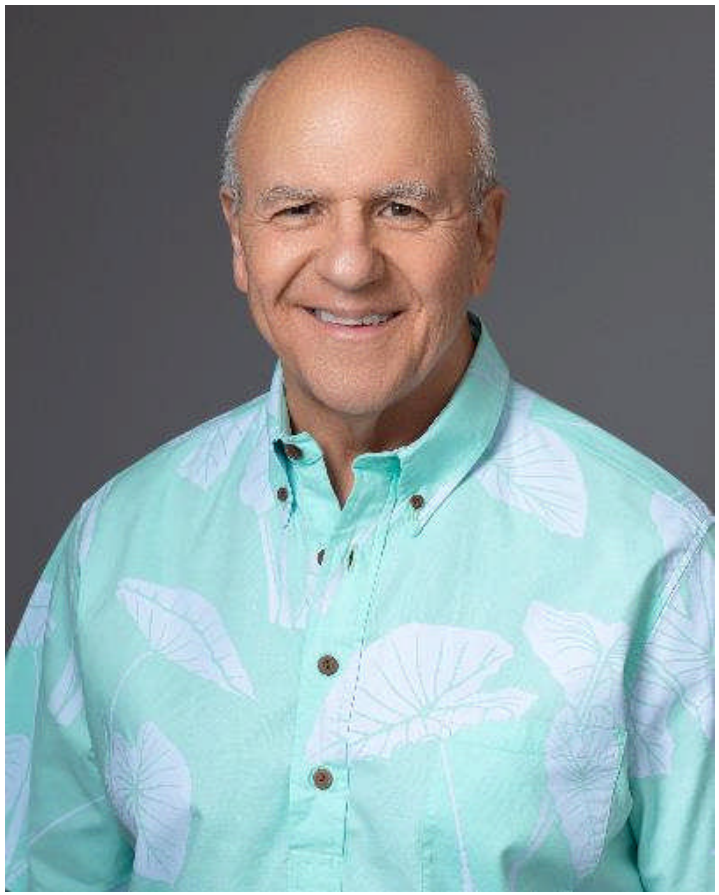
- **Zack Hartley**, Planner; *Lead Economist*
- **Vera Koskelo**, Public Involvement Specialist

Discussants (CCH):

- **Haku Milles**, PE, LEED AP; Deputy Director, Dept. of Design and Construction
- **Matthew Gonser**, AICP, CFM; Chief Resilience Officer, Office of Climate Change, Sustainability and Resiliency
- **Laura Thielen**, Director, Dept. of Parks and Recreation
- **Dawn Szewczyk**, PE; Director & Chief Engineer, Dept. of Facility Maintenance
- **Warren Mamizuka**, Deputy Director, Department of Facility Maintenance
- **Tyler Sugihara**, PE; Chief of Road Maintenance, Dept. of Facility Maintenance
- **Randall Wakumoto**, PE, Program Administrator, Storm Water Quality Division, Department of Facility Maintenance
- **Greg Tsugawa**, Dept. of Transportation Services, Regional Planning Branch
- **Peter Garino**, Dept. of Transportation Services, Performance and Business Analysis Branch

OPENING REMARKS

Mr. **Rick Blangiardi**,
Mayor, City and County of Honolulu



LTC **Ryan Pevey**,
Commander, Honolulu District,
US Army Corps of Engineers

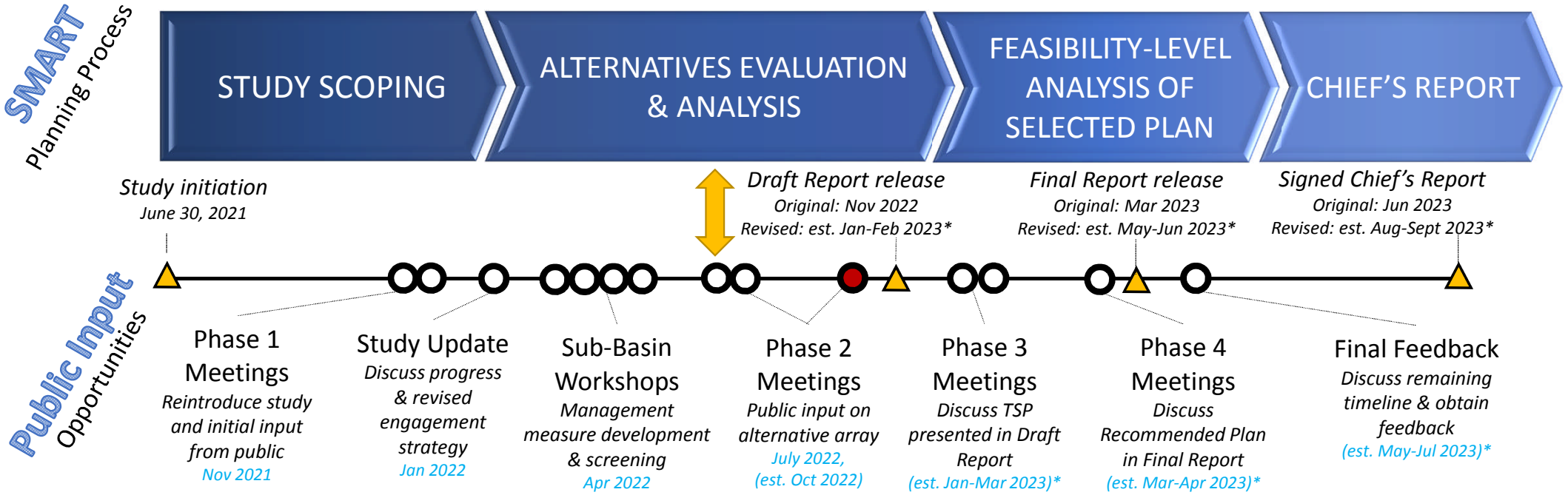
GROUND RULES: PRESENTATION

1. Post comments and questions in the chat or hold until breakouts.

2. Keep your audio on mute during the presentation.

3. If you are having technical difficulties, let us know via the chat and/or email to Tyson Vaughan: Earl.T.Vaughan@usace.army.mil.

STUDY PROCESS & TIMELINE



Study schedule delayed ***at least*** 2 months. Revised schedule being finalized and subject to change.

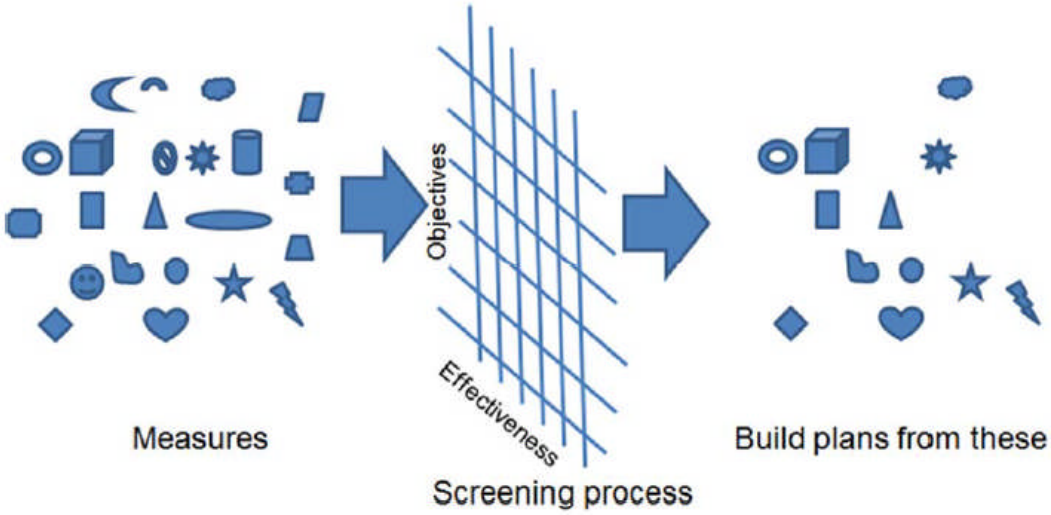
Effects of schedule delays on public input and engagement:

- July 2022 meetings now focused on ***initial alternatives*** not final alternatives.
- Additional time to engage and provide comments/feedback on plan development.
- Potential for additional virtual meetings to discuss final array of alternatives.

PLAN DEVELOPMENT: MEASURE SCREENING

Screening/tiering criteria:

- Study Authority – Is it within study authority?
- Technical Feasibility – Is it technical feasible?
- Effectiveness – Extent it would reduce life risk and/or economic damages.
- Efficiency – Expected cost-effectiveness.
- Environmental Effects – Benefits/impacts.



Existing models/data: water volumes, expected damages, high-level costs

Tiering to prioritize analyses:

- Tier 1: Highest analytical priority. Results could screen other measures.
- Tier 2, 3: Assessed after Tier 1 measures.

Tiering is not a hierarchy of importance or preference. Allows team to maximize efficiency. All measures will be assessed.

PLAN DEVELOPMENT: MEASURE SCREENING

Management measure tracker:

- Available at:

  https://www.honolulu.gov/alawai/resources.html

- Updated prior to public meeting
- Focused, real-time feedback on technical & planning process

223 measures being tracked

- 172 screened from further consideration
- 51 still under consideration

P(3

i Flood Risk Management GR Study - Management Measure Tracking Spreadsheet

dated: July 15, 2022

Tracking #	Measure Name	Basin	Description	Type	Status	Notes/Rationale
1	Flap gates on storm drains	Ala Wai Canal	During high tide Ala Wai Blvd. between Kalakaua and the cul de sac ending at Ala Moana Blvd. floods. Ala Wai canal in this area needs flap gates to keep Ala Wai Canal water from flooding storm drains and flooding streets.	Gates	Under consideration	Provision, modification, and/or maintenance of drainage systems to capture and convey interior runoff in urban areas is a non-Federal responsibility and therefore cannot be included in a recommendation made as a result of this general reevaluation report. However, this study can make modifications to natural stream channels or previously modified natural waterways that help reduce backup within adjacent drainage systems. Flap gates will be considered for all streams/areas that meet this criteria.
2	Elevate canal walls	Ala Wai Canal	Increase canal capacity by elevating the existing canal floodwalls	Floodwall/Berm	Screened Out	Components and concepts of this measure are included in #193. This measure will be screened out for redundancy.
3	Deepen the canal	Ala Wai Canal	Excavate to deepen the existing canal and stabilize existing floodwalls.	Channel Modification	Screened Out	Dredging to the maintenance elevation is encouraged for the City to maintain consistently. Deepening the canal further than the maintenance elevation is generally not recommended due to the stability of canal walls and slope stability. Increasing storage of the canal can technically reduce flooding but not without instability of the structural components of the bridges and canal walls. The integrity of the canal walls as-is would not withstand excavation - only replacing with an entirely new system would. Further analysis is needed to determine the stability of bridge pier and footings. See measure 5.
4	Deepen canal for periodic pump drainage	Ala Wai Canal	Dig existing walls deeper to turn the canal into a periodic pump drainage to address inundation by all three sources of flooding	Channel Modification	Screened Out	Digging the existing walls deeper is not recommended due to their strucutral integrity. Pumping the canal in its entirety to increase storage capacity is not recomended due to stability of the existing canal walls. Hydrostatic pressure is likely needed for structural stability. Technical analysis needed to determine structural stability of bridge piers and footings. See measures 5 and 197.
5	Deepen the canal, replace canal walls with higher flood protection	Ala Wai Canal	Dredge canal down to its original depth of 15' to 25', and replace the degraded infrastructure with new canal walls that are set for greater flood protection	Channel Modification	Under consideration	The integrity of the canal walls as-is would not withstand greater dredging efforts than maintence dredging - only replacing with an entirely new system would. Further analysis is needed to determine the appropriate wall height, the stability of bridge pier and footings, and the optimal depth that balances slope stability and flood storage.
6	Widen canal	Ala Wai Canal	Widen the canal to provide greater flow and storage capacity.	Channel Modification	Under consideration	Widening the canal for the entire length would require extensive real estate acquisitions with significant costs. Widening the canal in strategic locations, namely at the Eastern end of the canal, could provide more flood storage; further analysis is needed. Expanding canal storage through the use of floodwalls and/or utilizing existing storage areas along the canal (e.g., golf course, Ala Wai Community Park) are likely more efficient and are considered elsewhere.
7	Dredge Ala Wai Canal to original depth	Ala Wai Canal	Dredge canal down to its original depth of 15' to 25' since current dredging only goes down to 12'.	Channel Modification	Screened Out	Dredging to the maintenance elevation is encouraged for the City to maintain consistently. Deepening the canal further than the maintenance elevation is generally not recommended due to the stability of canal walls and slope stability. Increasing storage of the canal can technically reduce flooding but not without instability of the structural components of the bridges and canal walls. The integrity of the canal walls as-is would not withstand excavation - only replacing with an entirely new system would. Further analysis is needed to determine the stability of bridge pier and footings. See measure 5.
8	Dredge Manoa-Palolo	Lower Watershed	Dredge the Manoa-Palolo channel	Channel Modification	Under consideration - Tier 2	
9	Canal clean ups	Ala Wai Canal	Involve the community to conduct regular clean ups	Debris Management	Screened Out	Organizing clean-ups is outside the scope of the current study. Community involvement for clean ups after construction is a possibility; however, those initiatives those initiatives need to be initiated by other entities.
10	Effective Microorganisms (EM) to eliminate sludge	Ala Wai Canal	Use "genki balls" to clean up and eliminate sludge in the canal. These healthy microorganisms work to digest sludge in the canal which will help not only to evacuate water from the canal quicker, but also restore the ecosystem and reduce frequency for dredging.	Water Quality	Screened Out	Sludge eliminated by the genki balls would have to be extensive enough to reduce flood risk in order to be justified under the current study. Genki balls would eliminate the organic matter within the canal, which only makes up a small portion of material within the canal. Genki balls as a standalone measure would not provide enough reduction in material to increase storage capacity of the canal and reduce flood waters. Genki balls could be incorporated into a separate effort focused on ecosystem restoration.
11	Oysters to clean the canal	Ala Wai Canal	Use oysters as filters to clean the canal waters.	Water Quality	Screened Out	Improving water quality is outside the scope of this project. Oyster filters could be incorporated into a separate effort focused on ecosystem restoration.

NOTE: Only displaying measures 1-11 of 223 total.

Slide 11

P(3 of the 51... 42 are under consideration still and 9 are retained. of the 42, 19 are tiered for modeling. The remaining 23 are not tiered for modeling but are still under consideration. What's our plan for evaluating those 23?
- dams, storage tunnels, underground detention, and flood gates are not ideal due to $$ but have not evaluated them for H&H.
- bridge modifications, pumps, flap gates on an as-needed basis
- dredging canals need more info from the city
- 3 nonstructural

Philbin, Kelley A CIV USARMY CELRN (USA), 7/19/2022

PLAN DEVELOPMENT: MEASURE SCREENING

Measure Type	Count
Bridge Modification	1
Bypass	5
Channel Modification	8
Channel Naturalization	1
Dam	1
Detention	14
Floodwall/Berm	4
Gates	2
Impervious Surface Reduction	1
Nonstructural (Elevation, Floodproofing, Relocation, Warning/Planning)	4
Pumps	3
Reforestation	1
Tunnel/Conduit	5
No Action	1
Total	*51*

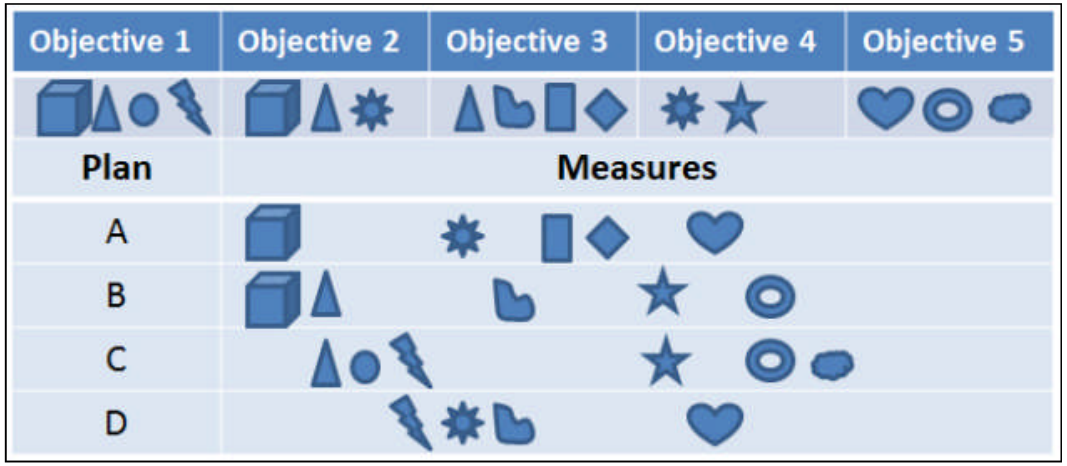
PLAN DEVELOPMENT: FORMULATION

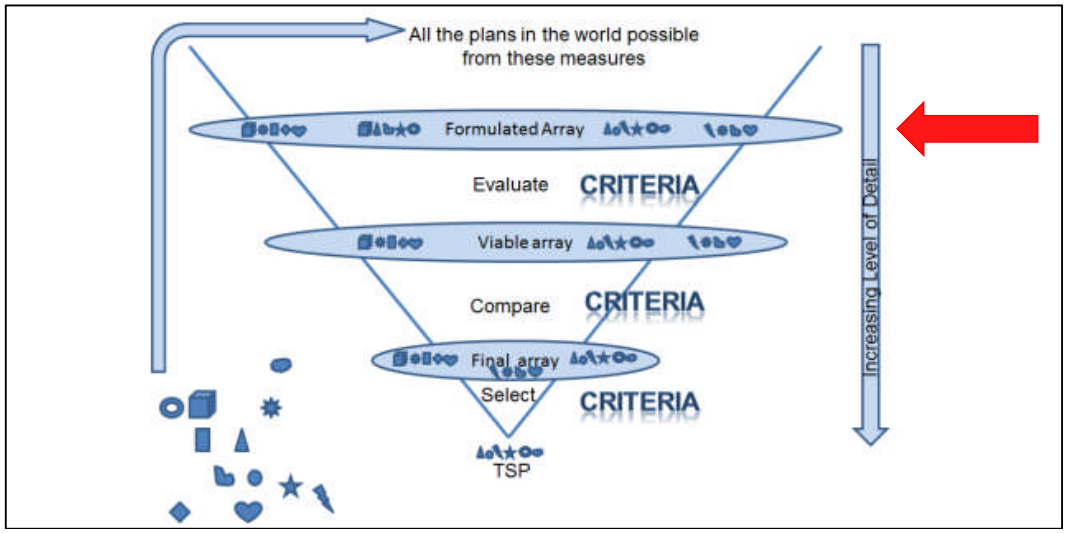
Plan Formulation – combining measures to make plans that meet study objectives

Large number of management measures and possible combinations requires deliberate process to formulation

Formulation is an iterative process. Successive iterations increase in detail.

Today, we will be discussing results of the first iteration – the initial array.





PLAN DEVELOPMENT: FORMULATION

Plan Form Strategy: Cornerstone strategy (aka First Added)

- Identify the ‘most important’ measure (i.e., cornerstone) for each plan.
- Add additional measures to cornerstones to meet objectives.
- Allows each ‘type’ of measure to be the focus of a plan.

Initial Array Cornerstones

1. Storage cornerstone
2. Modified conveyance cornerstones
   A. Existing infrastructure / bypasses
   B. Floodwalls
   C. 2nd outlet / daylight
3. Tunnel cornerstone
4. Natural and nature-based cornerstone
5. Hybrid/combined cornerstone
6. No action

PLAN DEVELOPMENT: FORMULATION

Plans represent results of 1st of several iterations of the plan formulation process.

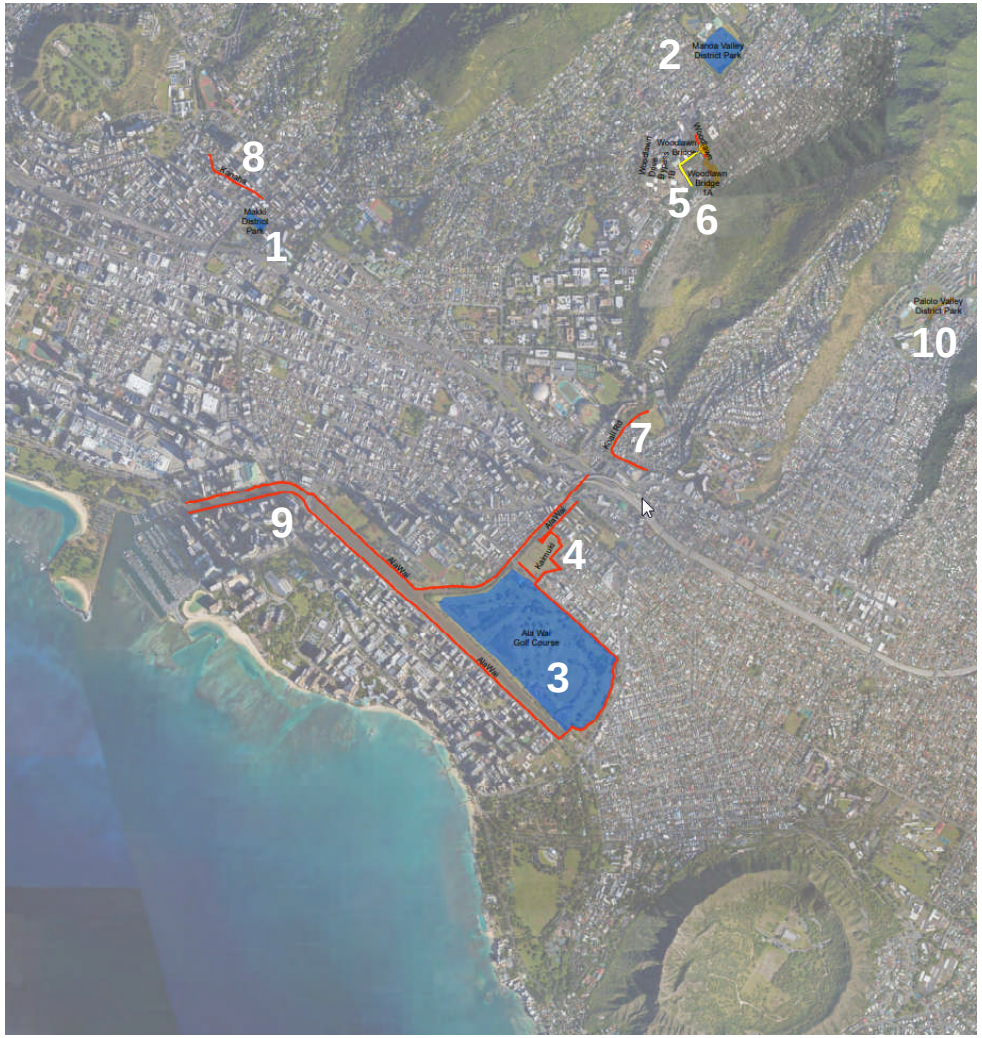
Plans presented today will be refined and reorganized based on additional technical analysis and public input/feedback.

Final recommendation likely not included in the initial array.

Measures and plans presented today are conceptual and will be refined during subsequent iterations.

Nonstructural plan will be more fully developed during the next iteration.

INITIAL ARRAY: ALT 1 – STORAGE



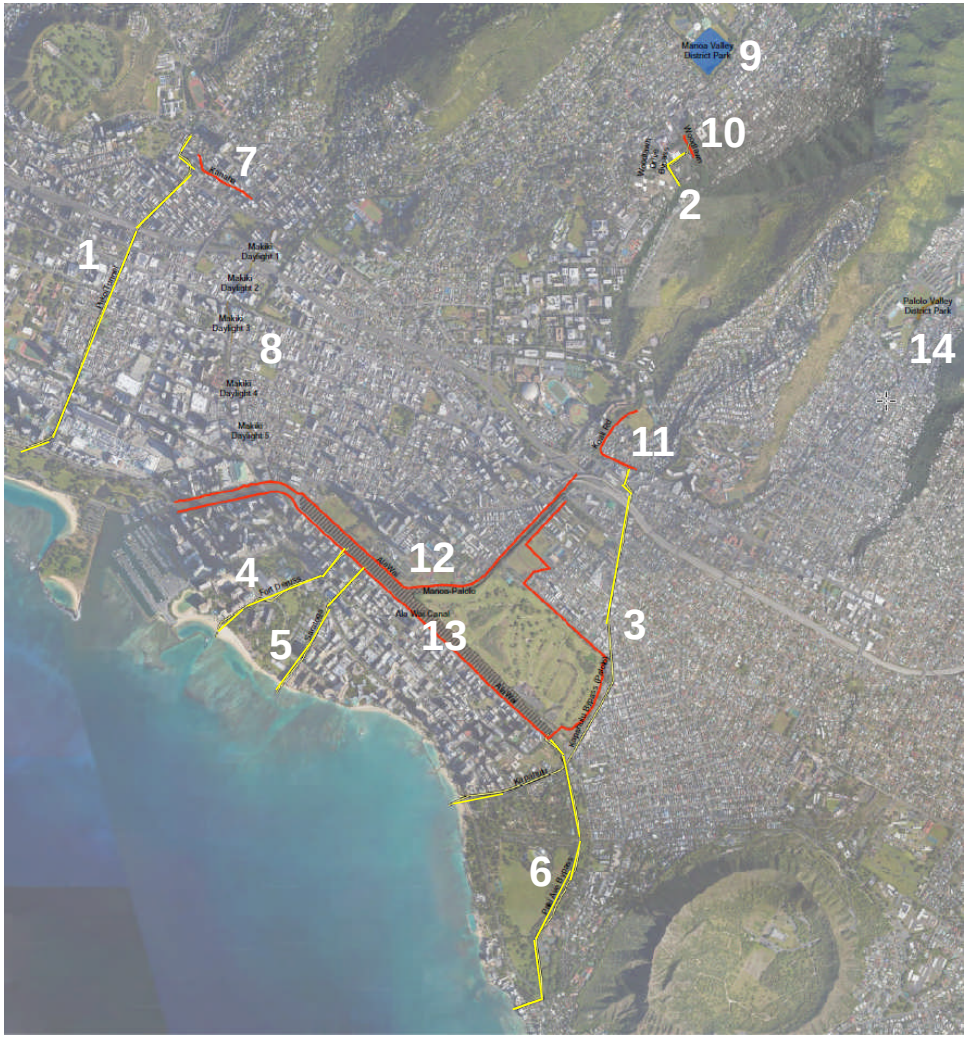
Storage Cornerstone:

1. Makiki District Park Detention
2. Manoa District Park Detention
3. Ala Wai Golf Course Detention

Additional Measures:

4. Kaimuki High School Storage
5. Woodlawn Floodwall & Channel Mod. OR Woodlawn Floodwall & Bypass
6. Woodlawn Bridge Modification
7. Koali Road Floodwall
8. Kanaha Floodwall
9. Ala Wai Canal Floodwall
10. Palolo District Park Channel Mod.
11. Pumps/other structures (flap gates) (not shown)
12. Nonstructural to reduce residual risk (not shown)

INITIAL ARRAY: ALT 2A – BYPASSES / EXISTING INFRASTRUCTURE



Cornerstone:

1. Piikoi Street Bypass
2. Woodlawn Bypass
3. Kapahulu Bypass
4. Fort Derussy Bypass
5. Saratoga Bypass
6. Paki Ave Bypass

Additional Measures:

7. Kanaha Floodwall
8. Daylight Makiki Stream
9. Manoa District Park Detention
10. Woodlawn Floodwall
11. Koali Road Floodwall
12. Ala Wai Canal Floodwalls
13. Canal Dredging (Ala Wai, Manoa-Palolo)
14. Palolo District Park Channel Mod.
15. Pumps/other structures (flap gates) (not shown)
16. Nonstructural to reduce residual risk (not shown)

INITIAL ARRAY: ALT 2B – FLOODWALLS

Cornerstone:

1. Kanaha Floodwall
2. Woodlawn Floodwall
3. Koali Road Floodwall
4. Ala Wai Canal Floodwalls

Additional Measures:

5. Kapahulu Bypass
6. Fort Derussy Bypass
7. Saratoga Bypass
8. Canal Dredging (Ala Wai, Manoa-Palolo)
9. Pumps/other structures (flap gates) (not shown)
10. Nonstructural to reduce residual risk (not shown)

INITIAL ARRAY: ALT 2C – 2ND OUTLET

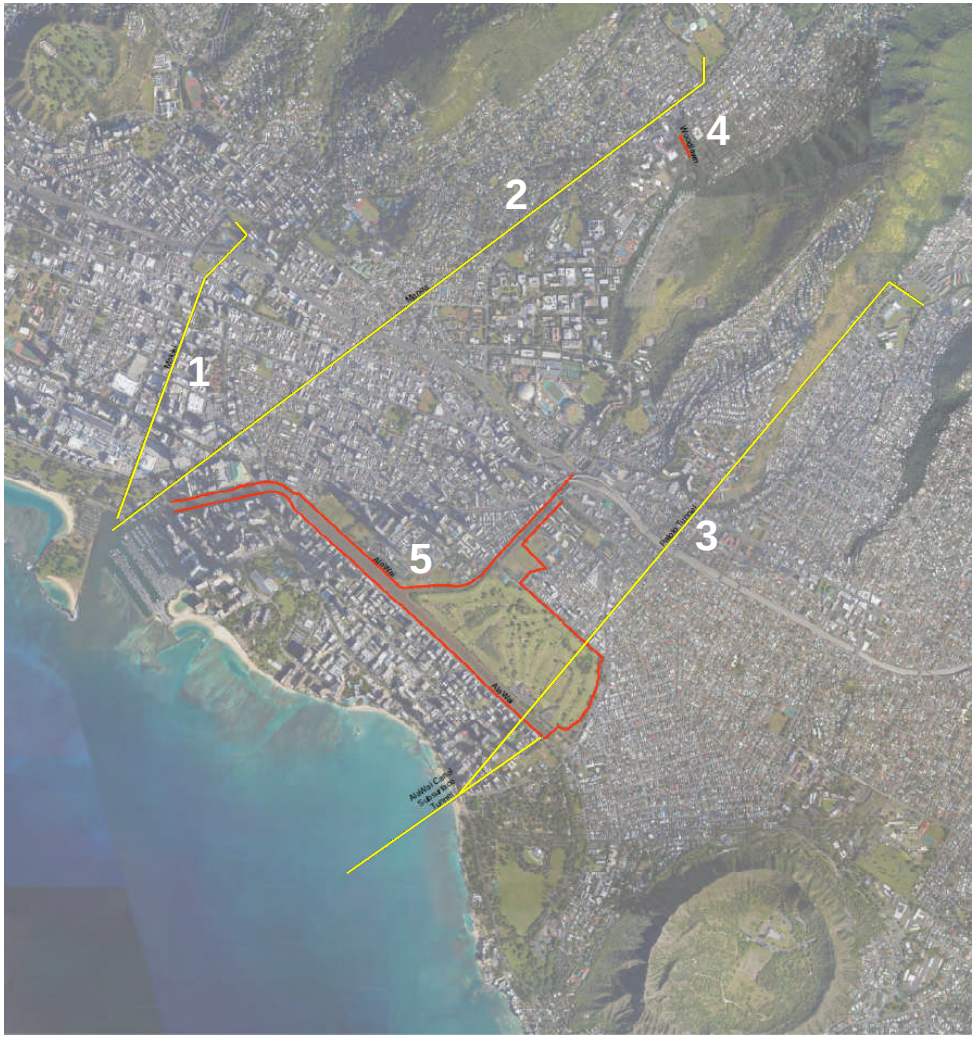
Cornerstone:

1. 2nd Canal Outlet

Additional Measures:

2. Kanaha Floodwall
3. Woodlawn Floodwall & Channel Mod.
4. Koali Road Floodwall
5. Ala Wai Canal Floodwalls
6. Pumps/other structures (flap gates) (not shown)
7. Nonstructural to reduce residual risk (not shown)

INITIAL ARRAY: ALT 3 – TUNNELS



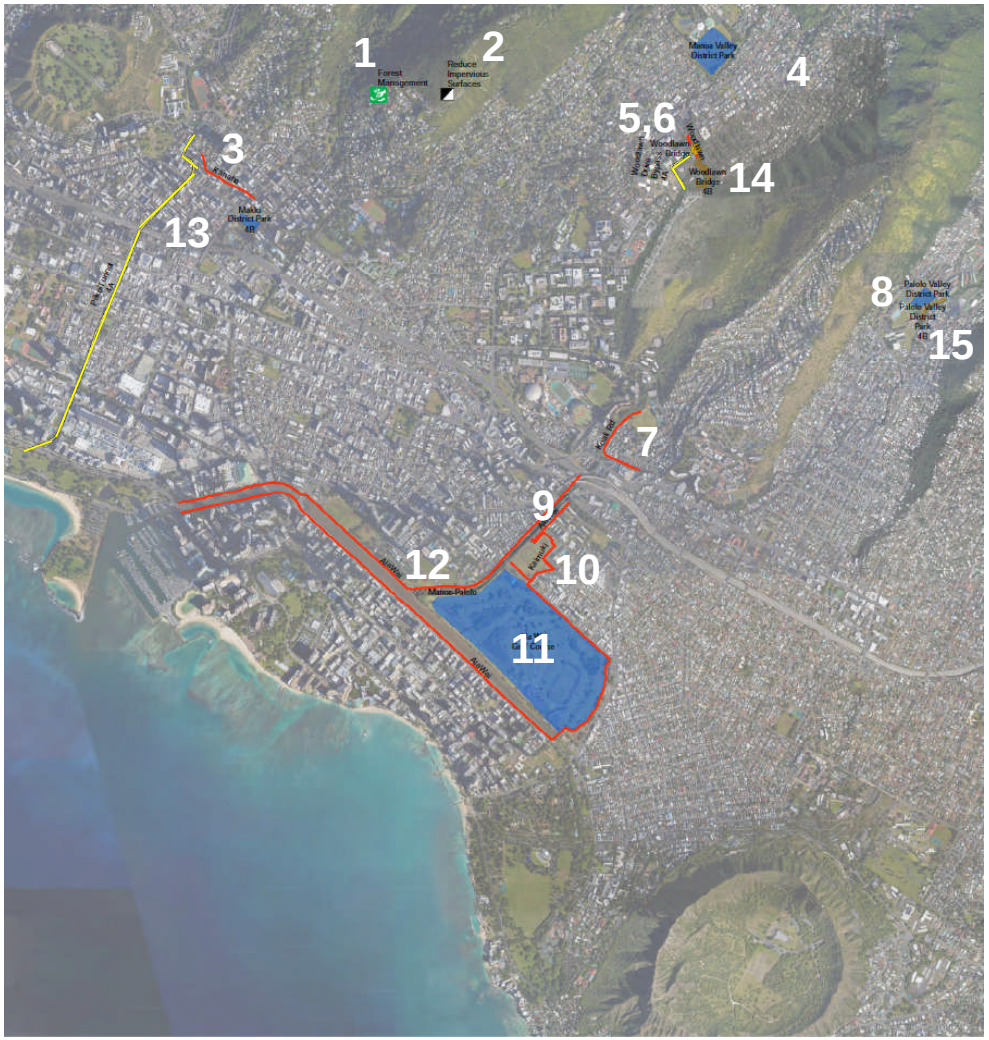
Cornerstone:

1. Makiki Tunnel
2. Manoa Tunnel
3. Palolo Tunnel

Additional Measures:

4. Woodlawn Floodwall
5. Ala Wai Canal Floodwalls
6. Pumps/other structures (flap gates) (not shown)
7. Nonstructural to reduce residual risk (not shown)

INITIAL ARRAY: ALT 4 – NATURAL & NATURE-BASED



Cornerstone:

1. Forest Management
2. Reduce Impervious Surfaces

Additional Measures:

3. Kanaha Floodwall
4. Manoa District Park Detention
5. Woodlawn Floodwall
6. Woodlawn Bridge Mod.
7. Koali Road Floodwall
8. Palolo District Park Detention
9. Canal Dredging (Manoa-Palolo)
10. Kaimuki High School Storage
11. Ala Wai Golf Course Detention
12. Ala Wai Canal Floodwall
13. Piikoi St Bypass (A) OR Makiki Dist Park Detention (B)
14. Woodlawn Bypass (A) OR Channel Modification (B)
15. Palolo District Park Channel Modification (B)
16. Pumps/other structures (flap gates) (not shown)
17. Nonstructural to reduce residual risk (not shown)

INITIAL ARRAY: ALT 5 – HYBRID/COMBINED PLAN

Cornerstone:

1. Manoa District Park Detention
2. Woodlawn Bypass
3. Ala Wai Canal Floodwalls

Additional Measures:

4. Woodlawn Floodwall
5. Koali Road Floodwall
6. Makiki District Park Detention
7. Kanaha Floodwall
8. Palolo District Park Channel Mod.
9. Pumps/other structures (flap gates) (not shown)
10. Nonstructural to reduce residual risk (not shown)

PLAN DEVELOPMENT: EVALUATION

Evaluation Criteria:

- Completeness: includes all actions needed to realize objectives/achieve effects
- Acceptability: consistency with laws, policy, and regulations
- Efficiency: preliminary cost/benefit analysis
- Effectiveness (life safety): reduced inundation/water velocities, impacts to critical & transportation infrastructure
- Effectiveness (economic damages): reduced inundation, damage estimates
- Environmental effects: qualitative assessment of impacts or benefits
  - e.g., in-stream habitat, marine habitat, water quality, terrestrial habitat, listed species
- Social considerations: qualitative assessment of socioeconomic considerations
  - e.g., Social equity, vulnerable populations, social identity, community cohesion, quality of life

Subsequent plan formulation iterations will modify and combine aspects of each alternative and refine data used for evaluation criterion

POLL: INITIAL ALTERNATIVES ARRAY

1. Storage
2. Other Structural Measures
   a. Bypasses / Existing Infrastructure
   b. Floodwalls
   c. Second Canal Outlet
3. Tunnels
4. Natural and Nature-Based Cornerstone
5. Hybrid / Combined Plan
6. No Action

WORKGROUPS

Webex main room. (here)
Facilitator: Vera Koskelo

Discussion group 1.
Facilitators: Tyson Vaughan and Kelley Philbin (technical lead)

Discussion group 2.
Facilitators: Eric Merriam (study lead) and Cindy Acpal (project manager)

Discussion group 3.
Facilitator: Zack Hartley (planner, lead economist)

45 minutes; random assignment

GROUND RULES: WORKGROUPS

1. Please stay on task.
2. Post comments and questions in the chat or use the “raise hand” tool.
3. Keep your audio on mute unless speaking.
4. Introduce yourself briefly the first time you speak.
5. When speaking, be conscious of acronyms and technical language.
6. Be mindful and help ensure that everyone has a chance to speak.
7. Send additional thoughts, questions and suggestions to AlaWai@honolulu.gov.

FIRST WORKGROUP SESSION

1. Rank the alternatives presented today.

2. Provide feedback on alternatives:
   a) Why did you rank them this way?
   b) Why do you prefer some over others?
   c) What do you like or dislike about any/all of the alternatives?

WORKGROUPS REPORT-OUT

1. Report your group's rankings of the alternatives.

2. Briefly describe reasoning, likes and dislikes.

5 minutes each group

SECOND WORKGROUP SESSION

1. Generate **your own** preferred alternative plan based on the 51 management measures still under consideration.

2. Explain your reasoning behind your alternative plan.

MANAGEMENT MEASURES LIST

Upper Watershed
- Bridge bypass and debris
- Detention basins
- Forest management

Manoa
- Woodlawn Bridge bypass box culvert
- Woodlawn Drive Bypass
- Manoa Channel Modification
- Kanewai Underground Storage
- Manoa Valley District Park Detention Pond
- Koali Rd Floodwall
- Woodlawn Bridge Floodwall
- Subsurface Kanewai Tunnel

Makiki
- Piikoi Bypass
- Modify Makiki Stream entry angle
- Daylight streams
- Makiki District Park and Tennis Courts detention pond
- Floodgate & bypass OR floodgate & pumps at Makiki Confluence
- Makiki Tunnel System

Palolo
- Modify Palolo Stream entry angle
- Palolo Channel Modification
- City Mill Culvert detention
- Palolo Park detention basin
- Palolo pipe within culverts

Lower Watershed
- Dredge Manoa-Palolo
- Kapiolani Park detention basin
- Add pump to McCully-Moiliili storm drainage system

Ala Wai Canal
- Paki Ave Bypass
- 2nd canal outlet (open)
- Deepen canal, replace/raise walls
- Widen canal
- Golf course detention basin (incl. excavation)
- Golf course underground parking structure
- Kaimuki High detention basin
- Ala Wai Canal floodwall system
- Ala Wai Canal surge barrier gates
- Flap gates on storm drains
- Ala Wai Canal pump station(s)
- Microtunnel through Waikiki

Watershed-Wide
- Bridge modification
- Basement parking structure detention
- Redetention
- Storage tunnels
- Underground detention (fields)
- Underground detention (parking lots)
- Berms around all schools
- Reduce hardcover and impervious surfaces
- Emergency preparedness plans
- Flood warning system
- Physical non-structural measures
- Risk communication / education
- Diversion tunnels
- SWIFT tunnels

- No action / do nothing

WORKGROUPS REPORT-OUT

1. Briefly describe your own alternative plan.
   a. What management measures does it feature?
   b. How does it work?
   c. Why is it a good/superior plan?

5 minutes each group

WRAP-UP: NEXT STEPS

- Thursday: in-person workshop at Ala Wai Golf Course Ballroom, 5:30-8:30 HST

- Email the project team: AlaWai@Honolulu.gov.

- Check the project website: https://www.honolulu.gov/AlaWai.
  - Sign up for additional meeting notifications
  - Comment form
  - Continuously updated FAQs
  - Follow the management measure and alternative plan tracker

MAHALO

Thank you for your participation!
See you again soon!